

Remarks

Applicant respectfully requests reconsideration of this application as amended.

Claims 1, 3, 4, 18, 31, 32, 34, 35, 40, 41, and 42 have been amended. No claims have been cancelled or added. Therefore, claims 1, 3-4, 7-9, 18, 20-21, and 27-45 are presented for examination.

35 U.S.C. §112 Rejection

Claims 1, 3, 4, 7-9, 18, 20, 21 and 27-45 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims, 1, 4, 18, 31, 32, 35, and 40 have been amended in order to obviate the rejection. Therefore, applicant respectfully requests the withdrawal of the 35 U.S.C. §112 rejection.

35 U.S.C. §103(a) Rejection

Claims 1, 3, 7-9, 18, 20, 21, 27-34 and 36-45 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Larsen et al. (U.S. Patent No. 5,835,705) in view of Dreyer et al. (U.S. Patent No. 5,657,253). Applicant submits that the present claims are patentable over Larsen in view of Dreyer.

Larsen discloses “the processor has first and second modes of operation . . . [and] when the performance monitor is operating in the first mode, a first counter within the performance monitor increments in response to each occurrence of the first event and a second counter within the performance monitor increments in response to each occurrence of the second event” (Larsen at col. 2, lines 2-9.) Larsen additionally discloses using a

“performance monitor . . . [to receive] as inputs event occurrences . . . [s]elected event occurrences among the numerous event occurrences that may be received by performance monitor are recorded . . . within Monitor Counters (PMCs) within performance monitor . . . [and the] performance monitor 50 outputs the value of the specified PMC” (Id. at col. 4, lines 46-64.) Larsen further discloses “in global mode the event occurrences generated by all of the logical partitions of processor are input into multiplexer. Multiplexer then routes the event occurrences to particular counters among PMCs in response to select input” (Id. at col. 5, lines 7-11).

Dreyer discloses an apparatus for measuring and monitoring various parameters that contribute to the performance of a processor. The apparatus includes a pair of programmable event counters for counting any two independent events selected from a predetermined list of processor events. A specialized register controls the operation of the event counters and also selects the events to be counted. The contents of the event counters can be accessed either by a supervisor mode program which reads an instruction or through a special access port.

(Dreyer at Abstract.)

Claim 1, as amended, recites:

An apparatus, comprising:

a processor to execute a plurality of threads simultaneously, each thread including a series of instructions and resulting in an event;

an event selection control register (ECSR) coupled to the processor;

a first multiplexer coupled to the ECSR to select a class of events, based on a first set of control signals from the ECSR, from a group of event signals issued from the processor;

a second multiplexer coupled to the ECSR and the first multiplexer to mask, based on a second set of control signals from the ECSR, subclasses of the class of events in order to select an event that belongs to a subclass that is not masked;

a logic circuit coupled to the ECSR and the second multiplexer to qualify the event based on a thread ID and a thread current privilege level

(CPL), the thread ID indicating a source of the event including a thread of the plurality of threads where the event occurred; and
an event counter to count the event qualified by the logic circuit.

Applicant submits that Larsen does not disclose or suggest a first multiplexer coupled to the ECSR to select a class of events, based on a first set of control signals from the ECSR, from a group of event signals issued from the processor and a second multiplexer coupled to the ECSR and the first multiplexer to mask, based on a second set of control signals from the ESCR, subclasses of the class of events in order to select an event that belongs to a subclass that is not masked, as recited by claim 1. Applicant can find no disclosure or suggestion of such a feature anywhere in Larsen. Figure 3 of Larsen illustrates two multiplexers. However, these two multiplexers operate concurrently to operate on different threads in a multithreaded processor. (Larsen at Fig. 3 & col. 5, ll. 22-36.) They do not operate by having the first multiplexer select a class of events, and then further having the second multiplexer mask these classes of events according to subclasses to select an event.

Furthermore, applicant can find no disclosure or suggestion in Dreyer of a first multiplexer coupled to the ECSR to select a class of events, based on a first set of control signals from the ECSR, from a group of event signals issued from the processor and a second multiplexer coupled to the ECSR and the first multiplexer to mask, based on a second set of control signals from the ESCR, subclasses of the class of events in order to select an event that belongs to a subclass that is not masked. Dreyer discloses the operation of a single multiplexer at Figure 1. However, Dreyer does not disclose or suggest two multiplexers operating together to select an event from a group of event signals by way of selecting classes of events and then masking these classes.

Neither Larsen nor Dreyer individually disclose or suggest the feature of claim 1 of a first multiplexer coupled to the ECSR to select a class of events, based on a first set of control signals from the ECSR, from a group of event signals issued from the processor and a second multiplexer coupled to the ECSR and the first multiplexer to mask, based on a second set of control signals from the ECSR, subclasses of the class of events in order to select an event that belongs to a subclass that is not masked. As neither Larsen nor Dreyer disclose or suggest this feature, any combination of the Larsen and Dreyer also cannot disclose or suggest such a feature. Therefore, claim 1 is patentable over Larsen in view of Dreyer.

The Office Action states that “one cannot show nonobviousness by attacking references individually where the rejections are based on combination of references.” (Office Action at pg. 2, point 2.) However, applicant is arguing that a particular feature of the claims is not shown in any reference of a combination of references. Logically, if a feature is not in any of the references, then the feature cannot be in the combination of references.

Claims 3-4, 7-9, and 30-31 depend from claim 1 and include additional limitations. Therefore, claims 3-4, 7-9, and 30-31 are also patentable over Larsen in view of Dreyer.

Independent claims 18, 32, and 40 contain limitations similar to those of claim 1. Accordingly, applicant respectfully requests the withdrawal of the rejection of claims 18, 32 and 40 and their dependent claims for the reasons discussed above with respect to claim 1.

Claims 4 and 35 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Larsen et al. in view of Dreyer et al., as applied to claims 1 and 34 above, respectively, and further in view of Diepstraten (U.S. Patent No. 6,205,468). Applicant submits that the

present claims are patentable over Diepstraten. Diepstraten discloses a context controller for managing multitasking in a processor. (Diepstraten at Abstract.) Claims 4 and 35 depend from claims 1 and 32, respectively. As discussed above, Larsen in view of Dreyer does not disclose or suggest a first multiplexer coupled to the ECSR to select a class of events, based on a first set of control signals from the ECSR, from a group of event signals issued from the processor and a second multiplexer coupled to the ECSR and the first multiplexer to mask, based on a second set of control signals from the ECSR, subclasses of the class of events in order to select an event that belongs to a subclass that is not masked, as recited by claims 1 and 32. Nor does Diepstraten disclose or suggest such a feature. As dependent claims necessarily include the limitations of their independent claims, claims 4 and 35 are patentable over Larsen and Dreyer in view of Diepstraten.

Applicant respectfully submits that the rejections have been overcome and that the claims are in condition for allowance. Accordingly, applicant respectfully requests the rejections be withdrawn and the claims be allowed.

The Examiner is requested to call the undersigned at (303) 740-1980 if there remains any issue with allowance of the case.

Applicant respectfully petitions for an extension of time to respond to the outstanding Office Action pursuant to 37 C.F.R. § 1.136(a) should one be necessary. Please charge our Deposit Account No. 02-2666 to cover the necessary fee under 37 C.F.R. § 1.17(a) for such an extension.

Please charge any shortage to our Deposit Account No. 02-2666.

Respectfully submitted,

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